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10/577,429	04/27/2006	Do-Hyung Kim	P0777	4724

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KED & ASSOCIATES, LLP
P.O. Box 221200
Chantilly, VA 20153-1200

EXAMINER	
COX, ALEXIS K	
ART UNIT	PAPER NUMBER
3744	
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/577,429	KIM, DO-HYUNG	
	Examiner	Art Unit	
	ALEXIS K. COX	3744	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *06 May 2009*.

2a)☒ This action is **FINAL**. 2b)☐ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-35* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *2, 4-12, 17-26, and 28* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☐ The specification is objected to by the Examiner.

10)☐ The drawing(s) filed on _____ is/are: a)☐ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☐ All b)☐ Some * c)☐ None of:

1.☐ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☐ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date _____.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 2 and all claims dependent therefrom are objected to because of the following informalities: the term “a compressor” on line 3 should be changed to “the compressor” to increase the clarity of the claim.

2. Appropriate correction is required.

Claim Rejections - 35 USC § 112

3. Claim 2 is rejected under 35 U.S.C. 112, first paragraph, as failing to comply with the enablement requirement. The claim(s) contains subject matter which was not described in the specification in such a way as to enable one skilled in the art to which it pertains, or with which it is most nearly connected, to make and/or use the invention. Claim 2 explicitly claims repeatedly stopping and rotating the compressor in the second rotation direction at pre-set time periods. The specification does disclose repeatedly rotating the compressor in the second direction at pre-set time periods, but does not disclose repeatedly stopping the compressor at pre-set time intervals after a single defrosting operation. (see figures 2, 7, 9, 13, 14, 15,16, and 19). In every figure which explicitly states stopping the compressor, the step immediately before is temperature checking; the only figure, figure 19, which stops the compressor after a pre-set time period without checking temperature does so as part of switching from clockwise to counterclockwise rotation, and only does so once rather than repeatedly. For the purpose of examination, this claim is being interpreted in accordance with the specification as meaning a single stopping of the compressor after the pre-set time

period, and repeated rotation of the compressor in the second rotation direction each pre-set time period.

Claim Rejections - 35 USC § 103

4. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

5. The factual inquiries set forth in *Graham* **v.** *John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

6. Claims 2, 4-12, 17-23, 25, 26, and 28 are rejected under 35 U.S.C. 103 (a) as being unpatentable over Loprete et al (US Patent No. 6,591,621).

Regarding claim 2, Loprete et al discloses a method for controlling an operation of a compressor of a cooling system comprising varying a cooling capacity of the cooling system a compressor is installed in by controlling a rotation direction of the compressor (see column 4 lines 23-24) according to a load condition of the refrigerator, wherein the cooling capacity of the system increases when the compressor is rotated in the first direction and decreases when the compressor is rotated in the second direction (see column 4 lines 38-44; see also lines 55-56). Loprete et al discloses the use of load

matching for fewer and shorter defrost cycles (see column 26 lines 51-52). This must comprise a step in which when the temperature inside the refrigerator and a pre-set defrosting temperature are identical, a defrosting operation is performed, as otherwise it is not load-matching. Further, as the temperature inside the refrigerator is greater following a defrosting cycle and the compression ratio is greater when rotated in the first direction, rotating the compressor in the first direction when the defrosting operation is terminated is also part of load-matching. Further, the system of Loprete is controlled by a thermostat (228, see column 25 lines 13-17), and the thermostat cited is programmable; as it is digital, it must have some defined sampling period, because that is part of the conversion from analog to digital, and therefore it therefore would have been obvious to one of ordinary skill in the art at the time of the invention to assess required compressor settings at pre set time periods in order to cause the thermostat to function. Additionally, stopping the compressor and rotating it in the second direction following a defrost cycle is an obvious result of the temperature of the controlled area being in the appropriate temperature range of the lower cooling capacity to be needed, as this is the method step that will result in the energy savings Loprete is directed to creating.

Regarding claims 4 and 7, Loprete explicitly discloses the coordination of a rotation direction and amount of the compressor with the amount of cooling air supply (see column 25 lines 13-17 and column 4 lines 38-44). It is noted that Loprete et al does not explicitly disclose the selection of an operation mode of the cooling system by a user. However, it falls within the realm of common knowledge to permit user

programming of a thermostat in order to permit timed temperature control of a home, and it would have been obvious to one of ordinary skill in the art at the time of the invention to use a user-programmable thermostat in the system of Loprete et al in order to permit timed temperature control of a refrigerator according to user-specific load patterns.

Regarding claims 5 and 6, regardless of which direction the compressor is rotated in it is according to the operation mode of the refrigerator. Additionally, any electrical motor is controlled according to the presence of a reference current value, because all electrical motors have a minimum current to be "on," below which they are "off." This constitutes detection of a reference current value. Further, Loprete discloses the implementation of turning off the compressor for a predetermined time period before running it in the reverse the previous direction, so as not to damage the motor and waste energy (see column 22 lines 4-9).

Regarding claims 8-10, it is noted that Loprete does not explicitly disclose the setting of an operation range of a temperature sensor for sensing the temperature inside the refrigerator according to the rotation direction of the compressor. However, it falls within the realm of common knowledge as mechanically expedient to calibrate sensors to the sensitivity most suited to the application at hand, and it would have been obvious to one of ordinary skill in the art at the time of the invention to program the thermostat of Loprete et al to have a higher sensitivity when running the compressor in reverse, as it would be less likely to inappropriately overreact at the slower potential rate of change in temperature available from the lower capacity of the compressor. Further,

the selection of the appropriate temperature ranges according to various system compressor capacities are a matter of routine experimentation, and therefore would have been obvious to one of ordinary skill in the art to implement in order to optimize the efficiency of the system.

Regarding claims 11 and 12, the examiner interprets the intent of the claims to be to set the amount of refrigerant required in the system according to the amount necessary when the compressor runs at the lower capacity. As it falls within the realm of common knowledge as mechanically expedient to avoid damage to systems by providing for the worst case scenario, it would have been obvious to one of ordinary skill in the art at the time of the invention to use the appropriate amount of refrigerant for the largest reasonable requirement.

Regarding claim 17, Loprete et al discloses a method for controlling an operation of a compressor of a cooling system comprising varying a cooling capacity of the cooling system a compressor is installed in by controlling a rotation direction of the compressor (see column 4 lines 38-44) according to a load condition of the refrigerator, wherein the cooling capacity of the system increases when the compressor is rotated in the first direction and decreases when the compressor is rotated in the second direction (see column 4 lines 38-44 and 52-56). It is noted that the steps of measuring the temperature inside the refrigerator when a door is closed, and again at a predetermined time interval after the closing of the door, in order to determine the rate at which heat was transferring into the refrigerator. However, as the load on a cooling system is determined in heat per unit of time, it would have been obvious to one of ordinary skill in

the art at the time of the invention to program the controller of Loprete et al to calculate the load from a single sensor and data gathered over time rather than multiple sensors taking data simultaneously in order to minimize the expense of parts and retain an accurate estimate of the cooling load placed on the system in order to control the compressor in an optimally efficient manner.

Regarding claim 18, the determination of appropriate pre-set temperatures is a matter of routine experimentation and as such would have been obvious to anyone of ordinary skill in the art at the time of the invention in order to determine the optimum points to program to maximize efficiency of the system.

Regarding claim 19, it is noted that Loprete does not explicitly disclose a step in which when power supplied to the refrigerator is cut off beyond a predetermined time and then re-supplied, the compressor is rotated in the first rotation direction, and a step in which when power supplied to the refrigerator is cut off within a predetermined time and then resupplied, the compressor is rotated in the same direction as a direction of the compressor before the power is cut off. However, as if power is cut off beyond a predetermined period of time, the internal temperature will rise to the point requiring the compressor to be run in the first rotation direction, and if power is cut off for less time than that it will not, it would have been obvious to one of ordinary skill in the art at the time of the invention to program the system to do so in order to implement it immediately, rather than waiting for a temperature reading to verify the necessity of cooling the interior.

Regarding claim 20, it falls within the realm of routine experimentation to calculate the optimum time period to optimize efficiency of the system.

Regarding claims 21-23, Loprete et al discloses a protector (208, see column 23 lines 6-11) which detects current, and uses that information to detect if a rotation direction of a rotation direction select signal for rotating the compressor and an actual rotation direction of the compressor are identical; and if the rotation direction of the rotation direction select signal and the actual direction of the compressor are different, the compressor is rotated in a direction opposite to the direction of the rotation direction select signal, because these are the only directions in which the compressor can rotate; further, if the rotation direction select signal and the actual direction of the compressor are the same, the compressor is rotated according to the rotation direction select signal.

Regarding claims 25 and 26, Loprete et al discloses a method for controlling an operation of a compressor of a cooling system comprising varying a cooling capacity of the cooling system a compressor is installed in by controlling a rotation direction of the compressor (see column 4 lines 38-44) according to a load condition of the refrigerator, wherein the cooling capacity of the system increases when the compressor is rotated in the first direction and decreases when the compressor is rotated in the second direction. It is noted that Loprete et al does not explicitly disclose a step in which the compressor of the refrigerator is rotated in the first rotation direction during a pre-set time in which the temperature inside the refrigerator reaches near the temperature set by the user, and a step in which when the pre-set time elapses, the compressor is rotated in the second rotation direction and stopped when the temperature inside the refrigerator

reaches the temperature set by the user. However, it would have been obvious to one of ordinary skill in the art at the time of the invention to program it to rotate at the greater compression capacity while the need for cooling was greater, and at the lower compression capacity while the need for cooling was lower, in order to prevent overshoot. It further would have been obvious to one of ordinary skill in the art at the time of the invention to program the controller of Loprete to stop the compressor between directions to prevent overload and damage to the motor, and to stop after the refrigerator had reached the temperature set by the user, again to prevent overshoot.

Regarding claim 28, Loprete discloses the rotation of the compressor in the lower capacity direction until the temperature of the controlled space has reached the desired temperature from a point near the desired temperature, as Loprete discloses the implementation of load matching (see column 26 lines 51-52).

7. Claim 24 is rejected under 35 U.S.C. 103(a) as being unpatentable over Loprete et al (US Patent No. 6,591,621) in view of D'Entremont et al (US Patent No. 5,200,872).

Regarding claim 24, it is noted that Loprete et al did not explicitly disclose the actual rotation direction of the compressor to be sensed through a rotation direction sensor installed at the compressor and the rotation direction sensor to generate a first or second signal according to the rotation direction of the compressor. However, the compressor of D'Entremont et al explicitly discloses the presence of a discharge pressure sensor as indicative of the direction of rotation of the motor (70, see column 2 line 68 and column 3 line 1; see also column 4 lines 44-46) in addition to other sensors. It would therefore have been obvious to one of ordinary skill in the art at the time of the

invention to implement the additional sensor of D'Entremont et al in the compressor of Loprete et al in order to provide a failsafe regarding the direction of rotation of the compressor.

Response to Arguments

8. Applicant's arguments filed 5/06/2009 have been fully considered but they are not persuasive.

The applicant alleges on page 15 that all claims have been amended to address the claim objections. However, as shown above, all claims referring to "clockwise" and "counterclockwise" have not been appropriately amended.

On page 16, the applicant argues that Loprete does not disclose repeatedly stopping and rotating the compressor at pre-set time periods, and controlling the rotational direction of the compressor to include defrosting operation. "Load matching" means operating the system such that the appropriate amount of cooling is performed for the cooling load. Defrosting will increase the cooling load. Those method steps which are not inherently disclosed by Loprete are suggested by these facts, therefore the argument is unpersuasive.

Additionally, the limitation of "repeatedly stopping *and* rotating the compressor" is neither disclosed nor suggested by the specification. As such, the interpretation of this limitation in accordance with the specification has been expressly indicated, and this argument is unpersuasive.

Regarding claims 17, 19, 21, 25, and those claims which depend therefrom, the applicant repeats the argument that reversal of the rotation direction after a pre-set time

period is not present. Should the applicant not concede that this is present as a result of load matching, they are reminded of the further evidence provided by Newton (US Patent No. 2,257,478), which explicitly discloses the commonality in prior art of reversing system direction according to a timer for defrost purposes, and therefore the obviousness of this method step. Therefore this argument is unpersuasive.

Conclusion

9. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure. Newton (US Patent No. 2,257,478) explicitly indicates it to have been common to reverse system flow direction according to a timer. TaeDuk (US Patent No. 5,285,646) discloses controlling the operation direction of a system by way of the voltage frequency. Tomyako et al (US Patent No. 4,598,559) discloses a reversing compressor. And Dinger et al (US Patent No. 3,503,222) discloses a compressor with operation controlled by a timer.

10. Applicant's amendment necessitated the new ground(s) of rejection presented in this Office action. Accordingly, **THIS ACTION IS MADE FINAL**. See MPEP § 706.07(a). Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

A shortened statutory period for reply to this final action is set to expire THREE MONTHS from the mailing date of this action. In the event a first reply is filed within TWO MONTHS of the mailing date of this final action and the advisory action is not mailed until after the end of the THREE-MONTH shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any

extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than SIX MONTHS from the date of this final action.

Any inquiry concerning this communication or earlier communications from the examiner should be directed to ALEXIS K. COX whose telephone number is (571)270-5530. The examiner can normally be reached on Monday through Thursday 8:00a.m. to 5:30p.m. EST.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Cheryl Tyler or Frantz Jules can be reached at 271-272-4834 or 571-272-6681. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/AKC/

/Frantz F. Jules/

Supervisory Patent Examiner, Art Unit 3744